Alternative 5

CALFED
BAY-DELTA
PROGRAM

B-001125

Alternative 5 - Summary

Habitat Restoration with Dedicated Environmental Water

Emphasis

Increase fish populations through natural production, and reduce entrainment to such an extent that fish take at diversions no longer has a significant effect on fish populations. Improve water supply reliability by reducing the frequency and duration of Endangered Species Act (ESA) constraints on water diversions.

Distinguishing Features

This alternative provides **moderate** levels of resource improvement and conflict resolution.

Physical/Structural	Operational/Management	Institutional/Policy
• Habitat restoration and creation to support fish populations • Screens on high and moderate priority diversions and salmon bypass at Old River to lower fish mortality • Moderate level of levee improvements incorporating habitat restoration to reduce system vulnerability • Restoration of 1,500 - 2,500 acres of tidal wetlands in Suisun Bay to increase fish production • Maintenance of floodway capacity to increase flood protection • New screened intake at Italian Slough	• Real-time monitoring and modified diversion operations reduce fish loss • About 100,000 AF of San Joaquin River water purchased to improve fish transport through the Delta • Pollutant source controls and increased flows to improve water quality	• Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability • Increased fish populations permit moderate reduction of ESA constraints on diversions

Benefits

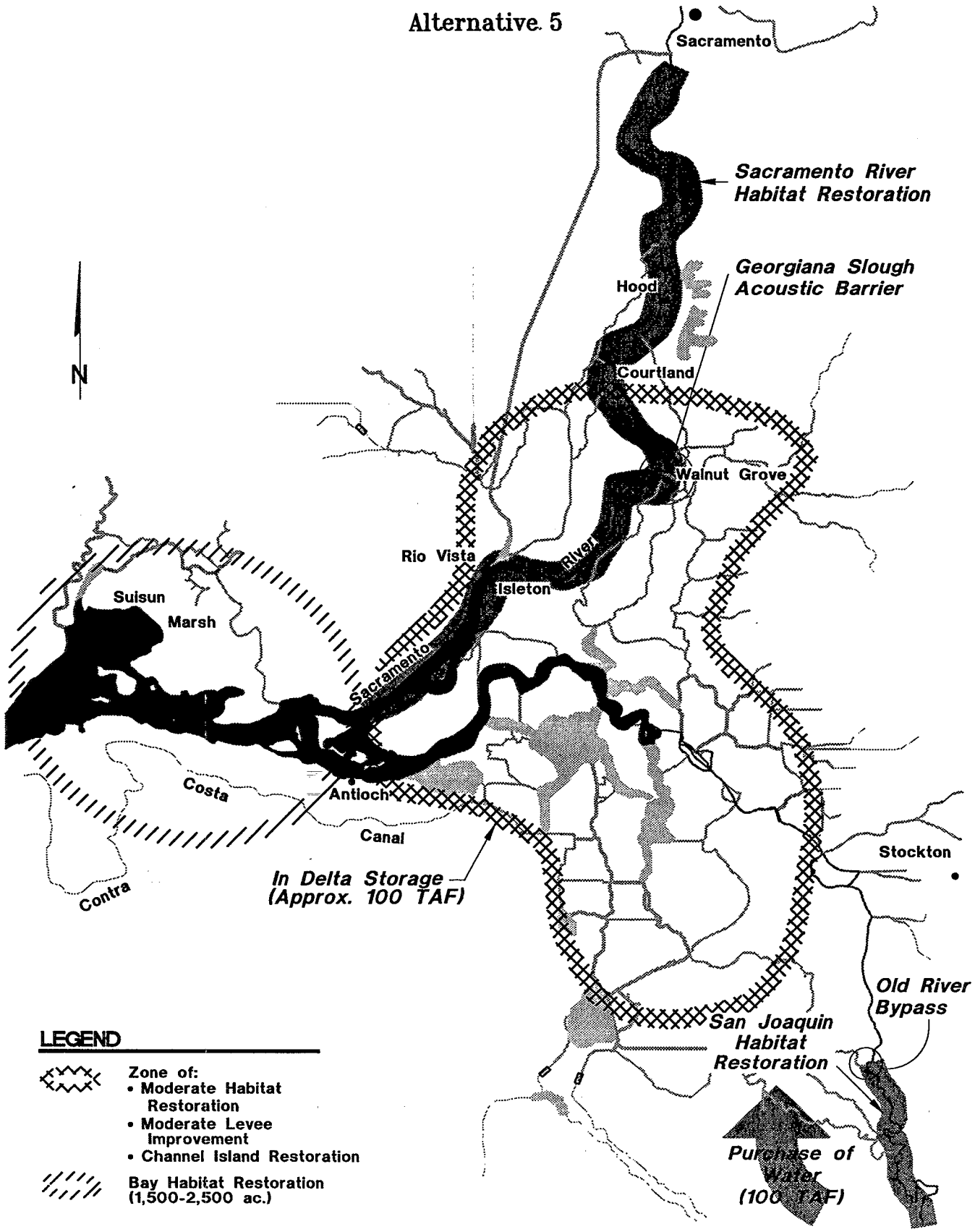
- Improves and enhances habitat to support sustainability of high-interest fish species
- Improves water supply reliability by moderately reducing ESA constraints on diversions
- Reduces vulnerability of Delta functions to catastrophic loss
- Improves Delta water quality

Constraints and Concerns

- Uncertain of the degree to which habitat improvements will reduce diversion constraints
- Uncertain of the length of time required to achieve intended improvements in fish population and water supply reliability
- Continued diversions of export supplies and resulting entrainment in the south Delta

Habitat Restoration with Dedicated Environmental Water

Alternative 5



S:\DWG\CALFED\CF-9 2-9-96

CALFED BAY-DELTA PROGRAM

B—001127

B-001127

Alternative 5
Habitat Restoration with Dedicated Environmental Water

Overview

This alternative emphasizes increasing fish populations by making habitat improvements. Moderately increased fish populations can reduce the frequency and duration of Endangered Species Act constraints on water diversions, improving supply flexibility and reliability. In addition, the purchase of San Joaquin basin water and new in-Delta island water storage will improve fish transport through the Delta.

improved habitat on Sacramento & San Joaquin Rivers and in-Delta to improve fish populations

Currently, limitations on fish entrainment (take limits) are set to avoid jeopardizing fish populations. When these limits are approached, diversions are curtailed or stopped, creating a high degree of uncertainty for water users. Fish populations are affected by many factors including diversion effects, flow, and other habitat conditions. As habitat is improved, leading to greater fish populations, the effect of diversions on population should be reduced. This should consequently lessen take limit constraints on diversions, providing improved water supply reliability.

provides improved water supply reliability

75-125 miles of habitat along levees

Restoration of habitats in the Sacramento River downstream of Sacramento and channel improvements in the San Joaquin River will improve survival of fish. In the Delta, restoration of shallow riverine and riparian habitat will provide spawning areas for native fish and increase forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. New habitat will be constructed along Delta channels. Moderate areas of shallow tidal habitat will be developed in the Suisun Bay, providing wet-year spawning and rearing areas for Delta smelt and rearing areas for salmon. Fish screens on moderate and high priority diversions and barriers will be installed to reduce entrainment and keep migrating fish in the main river channel.

fish screens on moderate and high priority diversions

1,500-2,500 acres of tidal wetlands in Suisun Marsh restored

A new water storage facility will be constructed in the south Delta, storing approximately 100,000 acre-feet for environmental uses. This facility will be filled through screened diversions when water is available and when fish entrainment effects can be avoided using real-time monitoring. Water will be released from this facility to improve fish transport conditions in the Delta and to shift the timing of diversions to avoid entrainment effects. Water will be purchased from willing San Joaquin basin water users and released to transport fish through the Delta and improve water quality in the San Joaquin River and south Delta.

100 TAF of new environmental water storage in Delta

This alternative includes a moderate level of levee improvements and an emergency management plan to reduce system vulnerability. Levee improvements will also incorporate habitat features. Water quality will be improved by controlling pollutant discharges at the source, and by supporting land retirement of agricultural lands with drainage problems.

100 TAF environmental water purchased on S.J. River

By linking moderate habitat restoration and levee improvements, this alternative increases fish populations while reducing system vulnerability. The conditions resulting from increased fish populations provide benefits to water supply reliability, predictability, and flexibility.

moderate levee improvements and control of pollution sources

Physical and Structural Features

Habitat Restoration

Activities	Benefits
• Restore riparian, shaded riverine, and shallow water habitat along the **Sacramento River channel** between Sacramento and Collinsville	• Provides substantial improvement in aquatic habitat as well as improvements in water supply reliability and water quality • Increases survival and spawning success of anadromous and Delta native fish
• Restore **Delta and floodway corridor** shallow water, riparian, terrestrial, and tidal wetland habitat	• Provides spawning areas for Delta native fish and forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
• Restore approximately 75 to 125 miles of shallow water, riverine, and riparian habitat along **Delta levees**	• Provides spawning areas for Delta native fish and forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
• Restore and protect **channel islands** from erosion and enhance habitat	• Provides habitat for aquatic and terrestrial plant and animal species • Improves water quality
• Restore about 1,500 to 2,500 acres of tidal wetlands in **Suisun Bay**	• Provides wet year spawning habitat for Delta smelt, rearing areas for salmon, and wildlife habitat (e.g. canvasback and redhead ducks)
• Restore riverine channel features in the **San Joaquin River** above the Delta to lower water temperature and to protect young fish from predation and straying	• Improves fish survival

Considerations
• **Sacramento River Channels** – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville.
• **Delta** – Candidate areas for shallow water habitat restoration include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Candidates for Delta levee habitat restoration include Twitchell Island along Threemile Slough and Sevenmile Slough, Georgiana Slough, and the North and South Forks of the Mokelumne River.
• **Floodway Corridors** – Habitat restoration must not impair capacity of floodways.
• **Suisun Bay** – Convert diked wetlands or create tidal wetlands with dredge spoils between Collinsville and Carquinez Strait.
• **San Joaquin River** – Confine wide, shallow channels and isolate in-channel gravel quarry areas. May not be self-sustaining.

Flood Protection and Levee Stabilization

Activities	Benefits
• Provide a **moderate level of protection and stabilization** of Delta levees through levee maintenance and stabilization actions	• Manages vulnerability of Delta land use and infrastructure • Manages vulnerability of Delta water supply to salinity intrusion • Manages vulnerability of Delta ecosystem functions • Provides opportunities for habitat restoration
• **Improve flood conveyance capacity** of Delta channels through channel maintenance and improvements	• Manages vulnerability of Delta functions • Improves flood conveyance • Provides opportunities for habitat restoration

Considerations
• Provide flood protection equivalent to Army Corps of Engineers PL 99 standard for these islands: All critical western islands such as Jersey Island. Islands with important regional infrastructure (e.g., Highway 12) such as Terminous Island Islands with both valuable habitat and important regional infrastructure (e.g., transmission lines) such as Lower Roberts Island.
• Upgrade all other Delta levees to meet at least the Hazard Mitigation Plan (HMP) standards.
• Integrate protection and stabilization of levees with Delta habitat restoration activities.
• Provide stable funding mechanism for ongoing levee and habitat monitoring, maintenance, and management.
• Improvements to channels include dredging for sediment removal in channels with restricted flood capacity.

Water Storage

Activities	Benefits
• Develop about 100,000 AF of **new water storage** in the Delta dedicated to environmental uses	• Provides additional diversion flexibility • Reduces entrainment of fish • Reduces frequency and duration of export curtailments, thus improving water supply reliability • Improves fish transport through the Delta • Could significantly improve response time (compared to Folsom and Shasta reservoirs) for releasing water for improved management of X2

Considerations

- Locate new Delta environmentall dedicated storage reservoir near export pumps on one or more islands such as Bacon, Mandeville, or Victoria.
- Divert water during November, December, and January; release water from March to July as needed. With real-time monitoring, divert when species of concern are not present and release water to move fish or release for diversion.
- Environmentally dedicated water storage in the Delta allows reduction in diversions during critical periods.
- Creation of a wide riparian and shallow water habitat corridor around the perimeter of Delta island storage would provide additional fish and wildlife benefits.

Fish Protection and Transport

Activities	Benefits
• Construct a **San Joaquin River bypass** at the head of Old River	• Encourages outmigrating fish to stay in San Joaquin River • Allows for managing flows down Old River
• Install **fish screens** on moderate and high priority diversions in the Delta, rivers, and tributaries	• Reduces entrainment of fish
• Construct new screened State Water Project intake at **Italian Slough**	• Avoids fish predation and entrainment in Clifton Court Forebay when diversion rates are low
• Improve drainage in **floodway corridors**	• Reduces fish stranding

Considerations

- Select diversions for screening according to criteria including size of intake, location, peril to fish, and screening feasibility.

Operational and Management Features

Water Diversion Management

Activities	Benefits
• **Acquire about 100,000 AF** of water from willing sellers in the **San Joaquin basin**	• Transports fish through San Joaquin River and Delta • Improves water quality • Improves management flexibility for diversions to reduce fish loss
• **Improve CVP and SWP operations** through predation control, coordinating operations, and improving fish salvaging and handling	• Reduces fish losses
• Improve **real-time monitoring** of locations of fish species of special concern and modify water diversions to avoid fish entrainment	• Provides an additional tool to help reduce entrainment of special-concern species • Improves flexibility to divert water during critical fish migration periods
• Evaluate, improve, and install **behavioral barriers** for anadromous fish	• Diverts anadromous fish from areas of potential entrainment and predation • Allows for continued water diversions at current locations

Considerations
• Can use San Joaquin environmental water for pulse flows to aid fish transport or dilute poor quality flows
• Coordinate use of San Joaquin environmental water with the operation of new Delta storage to improve timing of diversions
• Evaluate continued use of an acoustic barrier at the mouth of Georgiana Slough.
• Evaluate behavioral barriers for Delta Cross Channel and Threemile Slough.

Fisheries Management

Activities	Benefits
• **Mark salmon** produced in hatcheries	• Facilitates selective catch of hatchery salmon by commercial and recreational fisheries
• Conduct **net-pen rearing of striped bass** to supplant natural production	• Maintains recreational fishery • Reduces operational constraints on water diversions

Considerations
• Actions are intended to maintain recreational and commercial fisheries as well as enhance native salmon stocks.
• Need to assess impact of incidental mortality on native (unmarked) fish.

Water Quality Management

Activities	Benefits
• Increase enforcement of source control regulations for **agricultural drainage** and implement agricultural best management practices for water quality	• Improves Delta water quality
• Increase enforcement of source control regulations for **urban and industrial runoff** and implement best management practices for water quality	• Improves Delta water quality
• Integrate existing **land retirement and fallowing** programs for agricultural lands with drainage problems	• Improves Delta water quality • Provides land for potential habitat
• Integrate existing and support appropriate on-site **mine drainage remediation** measures to the maximum extent feasible	• Improves Delta water quality
Considerations	
• Identify priority pollutant sources such as Iron Mountain Mine and west-side San Joaquin agricultural lands. • Provide regulatory and institutional incentives for implementation of remediation measures.	

Institutional and Policy Features

Habitat Programs

Activities	Benefits
• Integrate recommended **habitat restoration actions from other programs**, including CVPIA and the Anadromous Fish Restoration Program	• Provides additional habitat restoration
• Establish programs to **preserve agricultural land uses** that provide valuable habitat functions	• Protects existing habitats
• Establish a CALFED team to coordinate and **expedite habitat restoration permits**	• Accelerates acquisition of permits for environmental restoration projects and other CALFED projects
• Establish and fund a management program and rapid response team to **manage introduced species**	• Protects existing valuable species and habitat
• Establish a program to identify and use clean **dredge materials** from the Delta for habitat restoration and levee maintenance in the Delta	• Provides materials for habitat and levee improvements
• Encourage farmers and levee maintenance districts to **leave habitat areas undisturbed** by working with resource agencies	• Protects existing habitats • Increases flexibility in maintenance programs

Considerations
• Coordinate activities to avoid duplication.

Water Quality Standards

Activities	Benefits
• **Reevaluate Delta export/inflow ratios** during triennial reviews as habitat effectiveness is realized	• Allows for higher level of water transfer as fishery populations improve
Considerations	
• Monitor to verify effectiveness of habitat and entrainment reduction programs. Develop an adaptive management program to modify habitat restoration and export/inflow ratios in response to improved sustainability of important species.	

Management of System Vulnerability

Activities	Benefits
• Establish and fund an **emergency levee management plan** to respond to levee failures	• Provides resources to protect Delta functions through proactive and preventative measures
• Establish **landside buffer zones** adjacent to levees on islands with deep peat soils	• Provides increase in stability of Delta levees and reliability of Delta functions by reducing subsidence adjacent to levees • Could be used to provide habitat benefit
Considerations	
• Determine extent and cost effectiveness of levee management programs and buffer zones. • Buffer strip approximately 100 to 150 yards wide dedicated to shallow wetlands.	

Preliminary Assessment

Benefits

- Improves and enhances habitat to support sustainability of high-interest fish species
- Improves water supply reliability by moderately reducing ESA constraints on diversions
- Reduces vulnerability of Delta functions to catastrophic loss
- Improves Delta water quality

Constraints and Concerns

- Uncertain of the degree to which habitat improvements will reduce diversion constraints
- Uncertain of the length of time required to achieve intended improvements in fish population and water supply reliability
- Continued diversions of export supplies and resulting entrainment in the south Delta